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**LEVEL I – THE SIX CATEGORIES OF BASICS**

**“the positions, lines, and paths”**

**LOWER BODY**

Stances

Foot and Leg Maneuvers

Foot and Leg Strikes

**UPPER BODY**

Blocks and Parries

Hand and Arm Strikes

Locks, Chokes, Others

**LEVEL II – THE SIX CATEGORIES OF PERFORMANCE**

**“the basics become tools”**

**PHYSICAL ATTRIBUTES**

Power – Intensity

Speed – Frequency

Conditioning – Duration

**MENTAL ATTRIBUTES**

Timing – Environmental Harmony (when)

Accuracy – Target Alignment (where)

Attitude – Emotional Purpose (how)

**LEVEL III – THE NINE CATEGORIES OF STRATEGY**

**“the tools become weapons”**

**POSITION FORMULATION**

Set-Up

Distance and Angle Control

Active Defense

Intention Disguise

Probing

Timing and Tendency Detection

**LEAD FIGHTER**

“make opponent hesitate”

Indirect Angular Attack – Against a Blocker

Broken Rhythm – Against a Counter Fighter

Immobilization – Against a Runner

**COUNTER FIGHTER**

“make opponent miss”

Redirect Attack – Slip or Parry

Interrupt Attack – Stop Hit

Absorb Attack – Target Fade

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**LEVEL II \* THE SIX CATEGORIES OF PERFORMANCE  
"THE BASICS BECOME TOOLS"  
  
POWER**

​**Motion Science™** **Level II \* Physical Attributes: Power  
​**  
**Overview**  
The body creates power for athletic performance in three ways, and there are a number of ways of expressing these three power principles. Sometimes they are referred to as:

* Torque.
* Back-up mass.
* Gravitational marriage.

Sometimes they are also referred to as **turning on an axis**, **directional movement**, and **dropping the body weight**. However the principles are stated, creating power for athletic performance is done simply by moving through the dimensions of width, depth and height.

Before going into the principles in more detail, a few factors must be discussed. Of course, the faster a mass is accelerated, the more energy will be developed. Therefore, speed won't be discussed as a factor in creating power, but thought of as a way of regulating how much power is achieved.

Also, the power which is created by the body can have a varying effect on an opponent depending on three conditions:

* The weapon that is used can alter the effect of a strike.
* The target being hit can alter the effect.
* The direction the target is moving in relation to the weapon can alter the effect of a strike.

For instance, if an person has the ability to create a theoretical maximum 10X of power, punching an opponent in the shoulder with a fist as he moves away from you, will not have the same effect as punching the opponent in the throat with a half fist as he moves towards you. This is assuming each strike used 10X of power. The second example creates much more effect on the opponent because a softer target (vital area) is hit with a more penetrating weapon (concentration of energy) as the target moves towards the strike (borrowed force).  
  
**Power Principles**

**Width or Torque**--The body rotates on many different axes when creating power. It could be the rotation of the arm in a punch, or the leg in a kick. Generally though, we refer to torque as rotating on an axis which runs from the top of the head, down the spine, and continuing to the ground. This vertical axis should be kept perpendicular to the ground.

**Depth or Back Up Mass**--Moving the body directly toward the target allows the weight of the body to be added to the energy of the strike.

**Height or Gravitational Marriage**--Gravity can be a friend or foe. If you fall, it is a foe, but if we use the energy from the pull of gravity and add it to our strike, the strike will be enhanced.  
  
**Summary**  
​A very clear example of these principles is the action of a baseball player batting a ball. First he steps toward the pitch, then rotates on his vertical axis as he drops his body weight into his legs. This is the movement of the body through the dimensions of width, depth, and height, and is used in almost all cases of the body generating power.

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### **SPEED**

### **Motion Science™** **Level II \* Physical Attributes: Speed**

There are three types of speed which relate to athletic performance.

Miles-per-hour speed

Reaction timing speed

Initial speed

**Miles-per-hour speed** is simply the time it takes to travel a certain distance. Most people have similar miles-per-hour speed in individual movements. Speed in multiple movements, like hand combinations or running, can vary greatly from person to person, since factors such as coordination and strength are involved. As an example, most people can do an individual movement like swatting a fly or stepping on a brake at about the same rate of speed. An average person can make an individual movement in about 8 one-hundredths of a second. This natural speed can be improved slightly, but a gain in miles-per-hour speed of an individual movement is not the key factor in increasing speed in athletic performance.

**Reaction timing speed** is also similar in most people. There is an exception to this. That exception is that one person's reaction timing speed in a highly trained movement can be significantly faster than that of an average person in the same movement. This is because of the high repetition involved in developing the trained movement and the efficiency that is achieved. Average reaction timing speed is about 20 one-hundredths of a second. Highly trained reaction speed can be as low as 10 to 12 one-hundredths of a second. To improve reaction timing speed, a person must do many repetitions over a long period of time. Notice, however, that the fastest reaction timing speed is slower than an average person's miles-per-hour speed.

**Initial Speed:** If miles per hour speed and reaction timing speed are similar in many people, and if the improvement of these speeds can be increased only to a certain level, there must be another factor that allows one person to be consistently faster than another person. This factor is initial speed, or how fast movement starts.

Although it is effected by inherent slow twitch vs. fast twitch fibers in the muscles, initial speed is still the one type of speed that a person has the most control over improving. It is the act of coming from non-action to action and is a function of coordination. Since an opponent will react to the first thing he or she sees, a slow starting speed, meaning it is broadcasted or telegraphed, will allow the opponent to open range or change angle, rendering the attack harmless. If on the other hand, the first thing perceived by the opponent is the attack in motion (assuming the correct distance is used), it is much harder for the opponent to escape.

Therefore, the truly fast athletes have better than average starting speed, or initial speed. And, to attain this fast starting speed, the athlete must first train his or her movements in a slow deliberate manner to learn the proper starting sequence, timing, coordination, and line and/or path of the movement. Once this is learned, the rate of speed of the movement can begin to be increased, thus positively influencing overall speed and athletic performance.

**Conclusion**

There are many conditions that can be placed on and describe speed in athletic performance. Although some people are naturally faster than others, improvement of miles-per-hour speed, reaction timing speed, and initial speed will allow each person to reach their highest level of speed in their movements.

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**CONDITIONING**

**Motion Science™ Level II \* Physical Attributes: Conditioning**

There are many aspects to physical conditioning. This includes aerobic and anaerobic training for muscles, the cardio-vascular system, and other systems of the body. Conditioning also includes diet. The goal here is not to go into detail on each aspect of conditioning, since this information is readily available elsewhere. Physical conditioning can be done for general health, or past that, for athletic performance.

**The three keys factors in exercise are as follows**

* Frequency – how often you work out
* Duration – how long you work out
* Intensity – how hard you work out

The body is very efficient and will respond by growing to meet the needs you place upon it, as long as what you do is appropriate for your current level of fitness. If the body is asked to do activity that is too far past its current level, a negative response will occur.

Physical conditioning for general health need only be mild activity (intensity), which raises the heart rate to about 60 to 70 percent of VO2 maximum (this formula can be obtained from charts available from many fitness resources). This should be done for about 20 to 60 minutes (duration) and averaging three times per week (frequency). The key to conditioning for general health is to be consistent, which means focus on your frequency.

Training for athletic performance requires increasing effort in all three areas of physical conditioning. Intensity and duration, as well as frequency, become increasingly more important as higher performance levels are desired. In the early stages of conditioning for a specific sport, doing that sport generally will produce positive results. Once a more advanced level is reached, supplementary exercise such as running and weight training may be required to effectively increase performance.

At the highest level of training for athletic performance is conditioning like that for a professional athlete. This requires a lifestyle change, since sleeping and eating habits must be altered and a strict schedule for all daily activities must be followed. This requires a much greater time commitment and is unrealistic for most people.

In summation, conditioning can be done for general health at one end of the spectrum, to training at a professional level at the other end. Each individual must decide on his or her personal goals and engage in a routine appropriate for those goals. In any event, frequency, duration, and intensity are the three key factors which should be considered.

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**TIMING**

**Motion Science™** **Level II \* Physical Attributes: Timing**

In some regards the concept of timing is abstract. It is hard to put into words or to visualize. When we discuss timing, we can think of it in terms of sequencing, or in other words, the order in which things happen.

Timing can apply to the order in which we move our own body parts to perform a certain movement or set of movements. This type of timing is called coordination or personal timing, but this is not what we will discuss here. Environmental timing implies moving in relation to that which is around us, i.e. people, obstacles, weapons, and weather to name just a few. Crossing a street and not getting hit by a car is simply a matter of timing.

Timing for athletic performance is how our movements are done sequentially in harmony with our environmental surroundings. The very best athletes in all sports have a superior sense of timing, and good timing is considered by some to be the most important attribute of an athlete.

As an example, we will discuss timing in relation to an opponent's movement. There are usually three phases in timing. They are:

**Moving Before, During or After an Opponent.**  
If an opponent throws a punch, we can let the punch extend by moving back and then follow the punch back in with a counter strike. Our goal is to be after his first strike and before his second--in other words, in between his actions.

**Moving at the same time as the opponent is more difficult.**  
If the opponent throws a punch, we can slip off the line of the attack and counter at the exact same time. If we are off the target line and the opponent is on it, we will hit our target.

**Moving before the opponent is the most difficult type of timing.**  
It is part reaction timing ([see the Motion Science™ section on **Speed**](http://www.karate99.com/MS_Speed.asp)) and part anticipation based on experience. As the opponent begins to throw a punch, we will fire our counter move and hit the target before the opponent's weapon has extended.

There are many drills that can enhance timing for your moves. Some can be done in the air, some on equipment, and some with a partner. Spend some time and make up some drills, but remember to practice all three phases. Either be after, at the same time, or before your opponent.

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**ACCURACY**

**​Motion Science™ Level II \*Mental Attributes: Accuracy**

**Overview**: Like accuracy in any sport, accuracy in martial arts is hitting the target. It should first be said that high repetition of the specific movement in practice is the key to achieving consistent accuracy. Of course, timing of the movement is of utmost importance, but this is covered in step [10 of Motion Science](http://www.nackordarchives.com/MS_Timing.htm). Therefore, we will discuss the other main aspect of accuracy, which is angle.

**There are three aspects of angle related to accuracy.**

* Target Access – starting from the correct place
* Angle of Entry – moving on the correct angle
* Angle of Mass – correct body alignment

​

**Target Access**  
Target access is striking the intended target while avoiding the parts of the opponent's body you don't intend to hit. One way this is done is by putting your body in the correct starting position relative to the opponent. As an example, if an opponent's arms are in the way, an off-angle strike (or arched movement) must be made. Changing your body angle in relation to the opponent will be necessary to get into the correct starting position for the strike. This will give you target access. Another way to gain target access is to fake to open the intended striking angle. If the fake works, the arms or obstacles will move (in contrast to moving yourself) which will allow target access.

**Angle of Entry**  
Angle of entry is the angle on which the target is hit. The strike should hit the target on an angle perpendicular to the target. If the target is hit at an obscure angle, the force of the strike will only partially be spent in the target. The rest of the force will be wasted.

**Angle of Mass**  
Angle of Mass refers to the correct alignment and direction of the body mass, including the correct alignment of the weapon. Generally speaking, the body moves in the same direction as the strike. This aspect of accuracy deals with the accuracy of the alignment which will enhance the effectiveness of the strike.

**Summary**  
Therefore, correct accuracy must start from the correct position for target access and then must hit the intended target at a perpendicular angle. Finally, the alignment of the body mass and weapon must be correct. If all three of these factors are present, the greatest accuracy will be achieved.

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**Attitude**

**​Motion Science™ Level II \*Mental Attributes: Attitude**

**I**n Motion Science™, when we speak of attitude, we mean being mentally focused, relaxed, and confident. Therefore, we will consider these three traits synonymous with the use of the word attitude. Moreover, this article only focuses on to how to achieve the correct attitude to enhance performance under pressure, even though there are other aspects to mental conditioning.

It takes training and experience to perform consistently under the pressure of either combat or sports, but it is somewhat easier in sports since there are rules. In combat, which can be considered a crisis, the uncertainty of the outcome can cause greater stress, thus there is greater difficulty in achieving the correct attitude. And, rather than discussing attitude in relation to cognitive thinking, which cannot bring on real attitude change, we will discuss attitude in relation to emotion. It should be said for clarity though--the conscience mind does activate the catalysts, which effect emotion.

Attitude (focus, relaxation, confidence) comes from an emotional level, and conscience thinking cannot bring on emotional levels. As an example, no one can make you love someone. But, through the practice of mental exercises, a person can bring on any desired emotional state through visualization; that is, picturing clearly in your mind a time when you were acutely in the emotional state desired.

This is done every day in one way or another by most people. When a speaker prepares to start his speech, he may straighten his tie, line up his papers, or adjust his posture. All these things are anchors, which put him in the correct zone to begin performing. Or a baseball pitcher will spit, scratch, and push his fist into his glove. He is getting into the zone and attaining the correct attitude to perform his task.

**We will consider three mental zones:**

* Comfort Zone
* Stressed Zone
* Performance Zone

The comfort zone is where we like to be and where individuals generally try to stay. Coming out of a comfort zone for even small reasons can cause some level of stress. Incidentally, coming out of our comfort zones must sometimes be done voluntarily, since this is usually the only way we can advance ourselves.

Sometimes we are forced out of our comfort zone into a stressed zone, like in a crisis situation. Some people handle these situations better than others do, but generally, there are two things necessary to take us from the stressed zone to a zone where we can function in a desired manner. The first thing is having something specific to do. This is usually preplanned, at least in our minds. The second is having some type of anchor, or trigger, to set this behavior into action.

Again, some people can do this naturally. But, most knowledgeable people believe proper and detailed practice of a desired response is necessary. These responses are trained through visualization, namely a method called **Guided Imagery Training**.

**Here is how it works.**

Usually, Guided Imagery Training is most effective when done with a trainer or facilitator. The trainer takes the subject to a relaxed state with some form of meditation. If the desired result is to have the subject respond with confidence to a stress situation, then the trainer will have the subject visualize a time in his/her life when the feeling of confidence was very strong. The trainer will ask the subject what was seen, what was heard, what may have been smelled, or any other sensory playback the subject can remember. The trainer will bring the subject as close as possible to the high state of confidence felt in the past, and when the subject is at that level, the trainer will ask the subject to activate a predetermined anchor. This could be something like touching the ear or closing the hand. The trainer will have the subject activate and deactivate the anchor a number of times. The feeling of confidence will then be tied to the anchor. A number of different responses can be tied to one anchor. As in our case, activating the anchor will bring on our desired attitude and will take us to our performance zone.

The effectiveness of this technique becomes better and better over time, and would be much more effective after, say 5 years, than after 1 year. Further, most people develop anchors to reach mental states to enhance performance and may not even be aware of it, as with the speaker or the baseball pitcher.

Through practice, we can learn to bring on a desired attitude in combat, even if, and rightly so, we are stressed and fearful. We can learn to be focused, relaxed, and confident using Guided Imagery.

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**LEVEL III \* THE NINE CATEGORIES OF STRATEGY  
"THE TOOLS BECOME WEAPONS"  
  
POSITION FORMULATION**

**Position Formulation**  
​Position formulation is one of the Level III advanced concepts of Motion Science™. Position formulation involves the strategies and tactics to place yourself in an advantageous position vis-à-vis your opponent. The components of position formulation studied in Motion Science™ are as follows.

**Setup--Distance and Angle Control**  
When facing an opponent, distance and angle should be immediately controlled. This is referred to as the "Setup". The control of distance is the most important action you can take.

This is done by staying at or beyond the range of the opponent's weapons and is called "controlling the critical distance". If you enter the critical distance, by either your own or your opponent's initiative, you should do so with either a strike or a fake. This weakens his position. You should never stay within the critical distance and be inactive.

Controlling angle includes controlling your angle in relation to the opponent and controlling the angle of your own body in relation to your center line. Once you are inside the critical distance of the opponent, angle control becomes the primary factor. Angle control uses the dimensions of width, depth, and height to control the opponent.

**Active Defense--Disguise and Disrupt**  
Active defense refers to the use of appropriate foot work and body maneuvers to disguise your intended course of action. It also refers to disrupting your opponent's timing and rhythm. Being an unpredictable fighter is the main goal of an active defense. A skilled fighter's intended movement can be disguised within his general movement. This is not to be confused with meaningless movement, which is moving around an opponent without intended purpose--the type of movement most seen with inexperienced fighters.

**Probing--Tendency and Timing Detection.** An integral part of sparring is deception. This is the ability to fake and is an essential factor in defeating an opponent. However, determining and implementing the correct deceptive strategy for the specific opponent you are facing is the real challenge. This is done by a tactic called *probing*.

Each opponent you face has a tendency to act in a certain way. He has favorite moves that make up his style of fighting. Some fighters charge in, some lay back, some like to kick, some like to punch, just to name a few. *Probing* is a tactic that uses false leads to allow the opponent's style to be determined. A false lead is the extension of a weapon towards an opponent without the commitment of body weight. So, when you first face an opponent, *probe* to see what he does and then choose the correct strategy to fit his style.

**Level III \* Lead Fighting**

Lead fighting is one of the Level III advanced concepts of Motion Science™. When sparring you can be either a *lead fighter* or a *counter fighter*. Of course, these roles can change instantaneously or even merge. This section reviews lead fighting.

When you are a lead fighter, do not attack a strong position. First, weaken your opponent's position with a fake or deceptive action to make him pause. An opening will be created with the pause, allowing you to score. Remember, when you attack you must ***make your opponent hesitate***. The components of lead fighting studied in Motion Science™ are as follows.

**Indirect Angular Attack - Against a Blocker**

This strategy is used against a person who stands his ground and is a *blocker*. Example of Indirect Angular Attack: move into range of your opponent with a low fake (on the half count) and follow with a high strike. This can be reversed with a high fake and a low strike. These are two of the most common indirect angular attacks and indirect angular attacking is the easiest and most common of lead fighting strategies. ***Indirect angular attacking is a fake of angle***.

**Broken Rhythm Attack--Against a Counter Fighter**  
This strategy is used against a person who is a *counter fighter*. That is, whenever you attack, the person tries to counter strike. In this case, we need to draw the opponent's counter and hit him when his weapon is returning from the missed counter. Example of Broken Rhythm Attack: we have determined that the opponent will try to counter punch our attack; therefore, we move into his range to draw his punch and move out of range when he delivers. This causes him to miss and allows us to score when he is out of position. ***Broken Rhythm attacking is a fake of distance***.

**Immobilization Attack--Against a Runner**  
This strategy is used against a *runner*, a person who doesn't stand still. This is the most sophisticated of the three lead fighter strategies. There are many subtle ways to stop a person from moving away from you. One is to reverse your direction and move away from the opponent. This sometimes draws the opponent towards you. Or, you can immobilize him by grabbing him or obstructing his leg with a check or sweep. Cutting angle and moving him toward the corner of a boxing ring is still another tactic. All of these tactics require advanced skill. Simple example of Immobilization Attack: lunge toward you opponent and grab his sleeve or arm as you pull him off balance; then counter punch the body. ***Immobilization attacking includes distance, angle, and attitude to be successful***.

**​**

**Level III \* Counter Fighting**

Counter fighting is one of the Level III advanced concepts of Motion Science™. When sparring you can be either a *lead fighter* or a *counter fighter*. Of course, these roles can change instantaneously or even merge. This section reviews counter fighting.  
When you are a counter fighter, you want your opponent to attack you. By seeming vulnerable in a certain target area, you can cause your opponent to attack that area. This weakens his position since you know where he is going to strike. A skilled counter fighter has the ability to cause an opponent to use a specific weapon, at a specific time, against a specific target. Remember, when you are attacked, you must ***make your opponent miss***.  
The components of counter fighting studied in Motion Science™ are as follows.

**Redirect Attack--Slip or Parry**  
Redirecting an attacker's energy is one tactic to use as a counter fighter. We can either redirect his energy off the line of attack with a *parry*, or we can move ourselves off the line with a *slip*. Most of the time a combination of these two is used when counter fighting. Example of a Redirect Attack: we lure the opponent to strike at our head with a forehand strike, then slip the strike and counter to the body. ***The Redirect Attack strategy moves off the line of an attack***.

**Interrupt Attack--Stop Hit**  
Interrupting an attacker's energy is another tactic to use as a counter fighter. Interrupting the attack puts a greater amount of energy in direct opposition to the attack using a *stop hit*. Example of Interrupt Attack: the attacker uses a lunging punch from his rear hand. As he crosses sides and enters our distance, we execute a defensive back kick, stopping his forward movement. ***The Interrupt Attack strategy moves into the line of an attack***.

**Absorb Attack--Target Fade**  
Absorbing an attacker's energy is the third tactic to use as a counter fighter. The energy of an opponent's attack can be absorbed with a target fade using a non-lethal part of the body as a shield. Example of Absorb Attack: an attacker kicks to the body. Fade away for the attack just far enough so the kick touches your shielding arm; then counter with a spinning back hand strike. ***The Absorb Attack strategy moves away along the line of an attack***.